

Oct. 13, 1953

M. ALDEN
RECORDER

2,655,427

Filed June 16, 1950

2 Sheets-Sheet 1

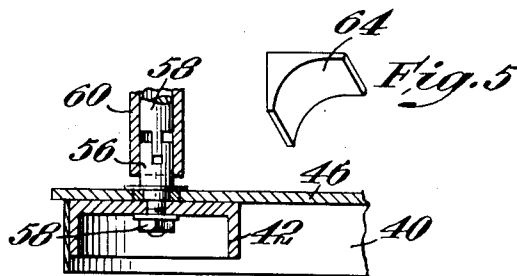
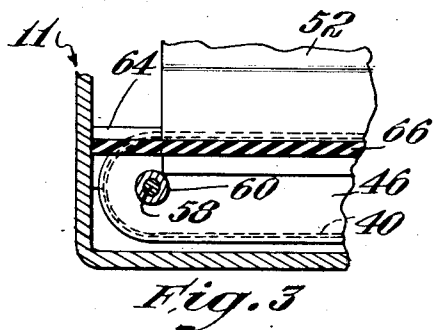
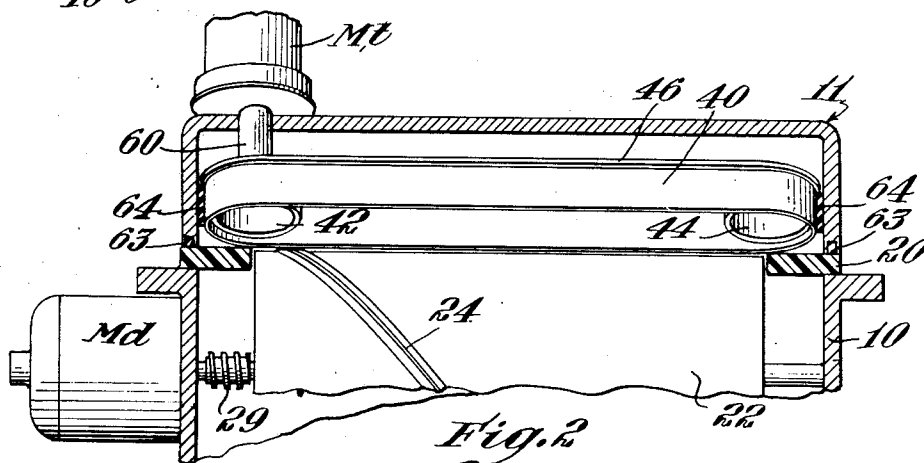
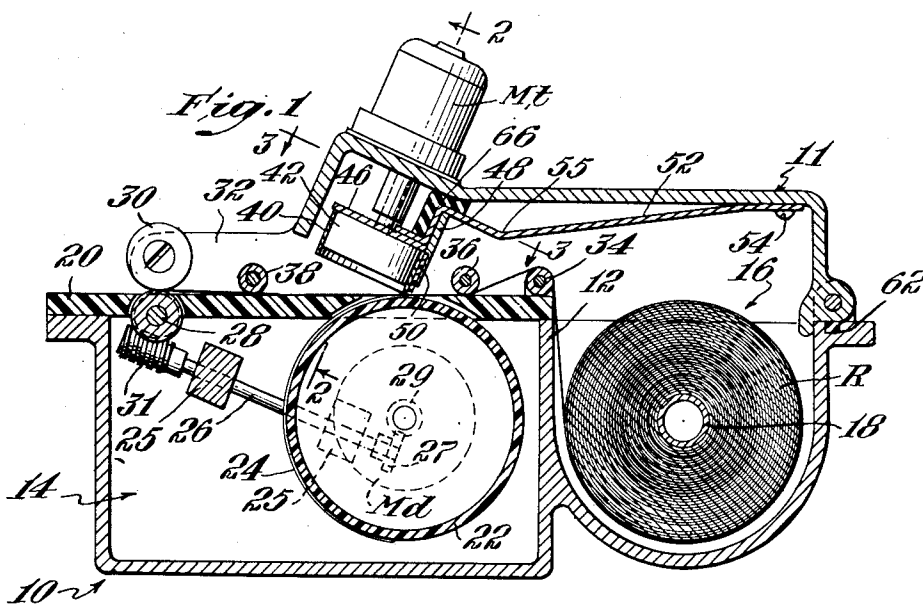


*Fig. 4 Inventor
Milton Alden
by Robert Cushman Groves
Attys.*

Oct. 13, 1953

M. ALDEN

2,655,427

RECORDER

Filed June 16, 1950

2 Sheets-Sheet 2

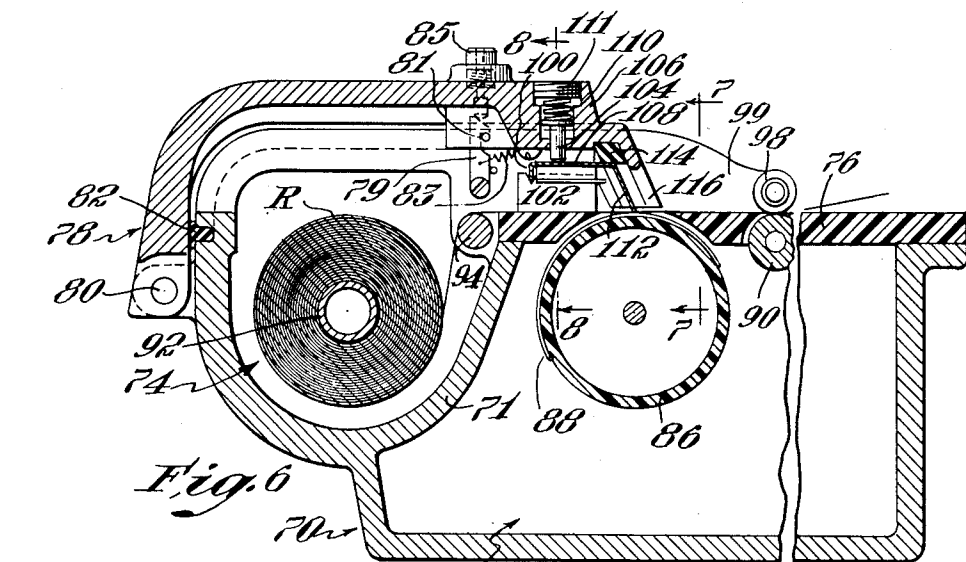


Fig. 6

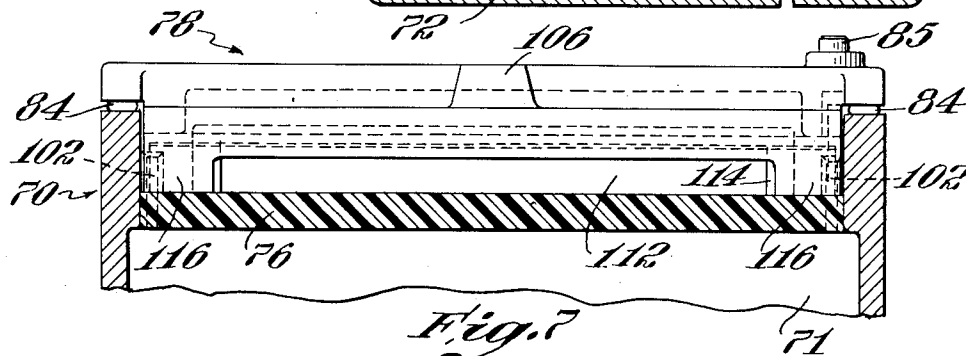


Fig. 7

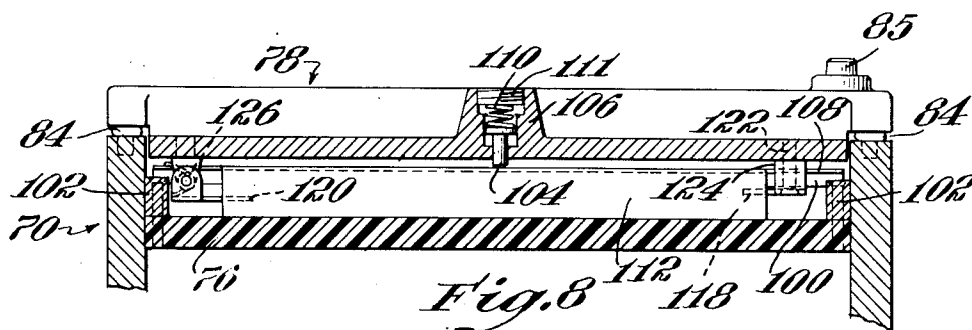


Fig. 8

Inventor
Milton Alden
by Robert Cushman & Groves
Att'ys.

UNITED STATES PATENT OFFICE

2,655,427

RECORDER

Milton Alden, Wellesley, Mass.

Application June 16, 1950, Serial No. 168,540

8 Claims. (Cl. 346—74)

1

In recorders wherein electrosensitive paper is employed as the recording medium, it is necessary that the paper be maintained with the proper degree of moisture content so that the electrical resistance is sufficiently low to permit the flow of the required electrolytic current to deposit the ions which change the color of the paper. In many recorders this is accomplished by enclosing the paper supply in a magazine compartment which is substantially sealed from atmosphere, the paper being brought out as required through a tortuous path or labyrinth. In recorders having a slow rate of paper feed and in those recorders which are used intermittent, the recording elements may also be enclosed in the magazine compartment to prevent dehydrating of the paper as it travels from the exit of the compartment to the recording elements as is described in my copending application Serial No. 577,754, filed February 14, 1945, now Patent No. 2,540,081, February 6, 1951. This latter arrangement, while satisfactory for many applications, has the inherent disadvantage of making it impossible to view the record until after it has passed through the labyrinth, which in very slow recorders may be a matter of hours.

Accordingly objects of this invention are to provide recording apparatus for electrosensitive paper which maintains the paper with the proper degree of moisture content, which permits viewing of the record immediately after recording, which reduces the number of sealing elements to a minimum, which is arranged so that the paper supply can be readily replenished, which allows the paper to be easily and readily threaded between the recording elements, and which advances the art generally.

In a broad aspect the invention contemplates apparatus for making a record upon electrosensitive paper which apparatus comprises a casing having a magazine compartment for holding a supply of the paper. The compartment is closed except for a slit out through which the paper is fed. One side of the slit is formed by a portion of a recording element or electrode, which portion is preferably but not necessarily the effective recording portion so that the paper and electrode constitute a seal for the magazine compartment.

In another aspect the recording elements are respectively a blade having an effective portion in contact with one side of the paper and a drum having helically disposed about its periphery a conducting strip which contacts the opposite side of the paper. The drum and blade form the re-

2

spective sides of the slit in the magazine compartment thereby constituting a seal for the compartment. In a preferred, although not a required arrangement, the blade is supported from the cover of the casing and positioned by stop means on the housing which completes the casing. The drum is journaled in the housing whereby the web of paper is readily threaded therebetween when the cover is opened. Upon closing of the cover, the drum and blade form the respective sides of the slit.

In one specific aspect the blade is channel-shaped, one flange thereof engaging V-shaped notches in stop pieces secured to the housing. The blade is resiliently supported from the casing cover with a sealing gasket of yieldable material interposed between the cover and blade. The other flange of the blade is the effective recording portion which is in contact with the paper and which forms one side of the slit.

In another specific aspect one of the electrodes comprises an assembly including a strip or tape of electrically conducting material positioned about two pulleys spaced at the opposite ends of a frame so that the tape forms a loop which is moved by driving means associated with one of the pulleys. The frame is hung from the cover by means of a resilient supporting panel so that the edge of one side of the loop is positioned transversely of the paper web with one of its edges in contact with the surface of the paper as the effective recording portion, the panel also forming one of the walls of the magazine compartment. A sealing piece or block is interposed between the cover and each of the respective pulleys so that the conducting tape comes in contact therewith as it passes about the pulleys. The panel and the sealing pieces close the compartment except for a slit for the paper, one side of which slit is formed by the tape edge, the other side being formed by the drum.

Further objects relate to various features of construction and will be apparent from a consideration of the following description and accompanying drawings wherein

Fig. 1 is a side elevation view in partial section of one embodiment of the invention;

Fig. 2 is a sectional view on line 2—2 of Fig. 1;

Fig. 3 is a fragmentary sectional view on line 3—3 of Fig. 1;

Fig. 4 is a fragmentary sectional view of the driving pulley;

Fig. 5 is an isometric view of one of the sealing pieces;

3

Fig. 6 is a side elevation view in partial section of a second embodiment of the invention;

Fig. 7 is a partial sectional view on line 7—7 of Fig. 5; and

Fig. 8 is a partial sectional view on line 8—8 of Fig. 5.

Referring particularly to Fig. 1 wherein is illustrated a recorder comprising a casing consisting of a housing 10 having a cover 11 which housing is divided by means of a wall or barrier 12 into a drum compartment 14 and a magazine compartment 16 wherein is journaled a spool 18 carrying a supply of electrosensitive recording paper R. The top of the drum compartment 14 is closed by a platen 20 of insulating material. Journaled within the drum compartment is one of the recording elements or electrodes which electrode comprises a drum or cylinder 22 of insulating material upon whose outer surface is secured a conductor 24 arranged as a single turn of a helix. A slotted aperture is provided in the platen 20 so that the periphery of the cylinder 22 can be located substantially tangent to the plane of the upper surface of the platen.

The cylinder 22 is rotated by means of a motor Md which also drives a paper feed roll 28 by means of a speed reduction unit consisting of a shaft 26 journaled in bosses 25 extending inwardly from the side wall of the housing 10. The lower end of the shaft 26 carries a gear 27 which engages a worm 29 on the shaft of the motor Md. The upper end of the shaft 26 carries a worm 31 which mates with a gear (not shown) on the shaft of the feed roll 28.

Cooperating with the paper feed roll 28 are two idler rolls 30 each of which is journaled at the end of a respective arm 32. The arms 32 extend from the opposite sides of the cover 11 so that the idler rolls engage the two ends respectively of the feed roll when the cover is in the closed position shown in Fig. 1. Upon rotation of the feed roll 28 by means of the above-described speed reduction unit, the web of paper R is unrolled from the spool 18 over an idler roll 34 whose ends are journaled in bosses extending upwardly from the housing 10, thence under two idler rolls 36 and 38 which are journaled in the cover 11 so that the web is held against the top surface of the platen 20, and thence between the idler rolls 30 and the feed roll 28.

As is best shown in Fig. 2, the second electrode comprises a tape 40 of an electrically conducting material, such as stainless steel, which is similar to the strip described in detail in my copending application Serial No. 149,182, filed March 11, 1950. The tape 40 is positioned about two spaced pulleys 42 and 44 so that the tape forms an elongated loop whose ends are butt welded or otherwise. The pulleys 42 and 44 are journaled at the respective ends of a frame comprising the plate 46 having a flange piece 48 (Fig. 1) extending normally from one of the sides thereof. The lower portion of the flange piece 48 is recessed to receive a strip 50 which backs up the effective portion of the tape 40 to prevent bending or buckling thereof. The tape 40 is further positioned by the plate 46 which bears against the top edge thereof.

The entire upper electrode assembly is resiliently suspended from the cover 11 by means of a cantilever member in the form of a resilient panel or plate 52, one end of which is attached to the underside of the cover by means of screws 54. The plate 52 is bent upwardly at an oblique angle as at 55 and is provided with two oppo-

4

sitely disposed right angle bends so that the extended end thereof lies against the top of the plate 46 and the inner surface of the upper portion of the flange 48. The portion of the plate 52 adjacent the flange 48 is attached thereto by means of rivets or spot welds (not shown).

The tape 40 is moved about the pulleys 42 and 44 by means of a very slow speed electrical motor Mt which is mounted upon the top of the cover 11, the motor Mt being mechanically coupled to the pulley 42 as is shown in Fig. 4. The pulley 42 is attached to the small threaded end of a shaft 56 by means of a washer and nut 58, relative rotation between the shaft and the pulley being prevented by a conventional key (not shown). The larger end of the shaft 56 is provided with a transverse axial slot or groove which engages a corresponding tongue upon the lower end of the shaft 58 of the motor Mt. The shafts 56 and 58 are maintained in axial alignment by means of a stationary surrounding sleeve 60 whose upper end is pressed in an aperture in the cover 11 as is shown in Fig. 2. The above described tongue and groove permit axial movement between the shafts 56 and 58 so that the electrode assembly is free to move thereby compensating for irregularities or eccentricity in the drum 22.

When the cover 11 is closed, the crevice between the cover 11 and the flange of the casing 10 is sealed by means of a gasket strip 62 (Fig. 1) carried in a groove in the flange. Similar gasket strips 63 (Fig. 2) carried in grooves in the sides of the cover 11 complete a seal between the cover and the platen 20. A sealing piece or block 64 such as is shown in Fig. 5 is interposed between each of the respective pulleys 42 and 44 and the sides of the cover 11. The sealing of the movable electrode assembly is completed by means of an L-shaped strip 66 of resilient material which is interposed between the inner surface of the cover 11 and the plate 52. As is best shown in Fig. 1, the strip 66 is formed to the contour of the supporting panel 52 about the first right angle bend, one leg thereof being of sufficient length to come in contact with the portion of the panel 52 which is against the plate 46. The other leg of the strip 66 has sufficient thickness so that it is compressed between the inner surface of the cover 11 and the top surface of the panel 52.

From the above it will be apparent that the magazine compartment is substantially sealed from the outside atmosphere except for the slit between the effective edge of the tape 40 and the periphery of the drum 22. This slit is closed by the web of paper R as it is fed through the recorder so that the leakage of air into and out of the magazine compartment is minimized, the compartment acting as a humidifier wherein the paper supply is maintained with the proper moisture content up to and including the point at which recording takes place. It will be noted in this connection that immediately after recording, the web of paper emerges from the moist magazine compartment so that it begins to dry and is immediately visible, permitting reading of the record substantially as soon as it emerges from between the recording electrodes.

The above described invention is not limited in use to recorders having a moving blade or tape electrode, but as shown in Fig. 6, the principle involved is equally applicable to a recorder having a fixed blade electrode. The recorder shown in Fig. 6 comprises a casing including a housing 70 which is divided by means of a partition 71.

into a recording drum compartment 72 and a magazine compartment 74. The recording drum compartment 72 is closed by a platen 76 of an insulating material such as a suitable plastic. The magazine compartment is closed by a cover 78 hinged to the side of the housing as at 80, the crevices between the housing and the cover being sealed by means of the gasket strips 82 and 84 (Fig. 7). The cover 78 is restrained in its closed position by means of a latch member 79 (Fig. 1) which is pivotally secured to the housing 70 so that it is held in engagement by means of a spring 83 with a pin 81 extending from the side wall of the cover 78. The latch member 79 is released by manually depressing a spring loaded plunger 85 which bears against the declivous upper end of the member.

An insulated drum or cylinder 86 carrying a helically disposed conductor 88 upon its outer surface is journaled in the compartment 72 so that it projects into a slot in the platen 76 with its periphery substantially tangent to the upper surface of the platen. The motor and drive for the cylinder and a feed roll 90 are not shown but are similar to the motor Md and the speed reduction unit which were described in detail heretofore with reference to the first embodiment shown in Fig. 1.

The paper supply R is carried upon a bobbin or spool 92 which is journaled in the magazine compartment 74. As the recorder operates, the web of paper is unwound from the spool 92 and passes over an idler roll 94 whose ends are journaled upon opposed walls of the magazine compartment, thence over the top surface of the platen 76 so that it passes between the cylinder 86 and a blade electrode depending from the cover 78 which is described in detail below, and thence between the driven feed roll 90 and two cooperating idler rolls 98 which are journaled upon respective arms 99 extending from opposite sides of the cover 78. As is best shown in Fig. 6, the blade electrode has a cross section in the form of a channel, the shorter flange 100 of which rests in two stops such as the V-notched blocks 102 when the cover 78 is closed. One of the blocks 102 is secured to either side of the platen 76 adjacent the respective side walls of the housing 70 as is shown in Fig. 8 so that the notches engage the opposite ends of the flange 100. A pin 104 is slidably arranged in an aperture in a boss 106 in the cover 78 so that the lower end thereof contacts the medial portion of the web 108 of the blade electrode. The opposite end of the pin 104 is provided with a head which is in contact with the lower end of a biasing spring 110 thereby to exert a force upon the blade electrode so that the blade pivots in the blocks 102 to bring the edge of its longer flange 112 into contact with the conductor 88 upon the outer surface of the cylinder 86. Adjustment of the spring 110 is provided by a threaded plug 111 which restrains the upper end of the spring.

Further pivotal force is supplied by a strip 114 of resilient material which is carried in a transverse groove in the underside of the cover 78 so that the bottom of the strip is in contact with the forward edge of the web. This strip 114 also acts as a seal, the ends thereof being brought down along the respective ends of the blade flange 112 so that the forward surface of each strip end comes in contact with a respective appendage 116, which appendages extend downwardly from either side of the cover as is shown in Fig. 7.

When the cover 78 is lifted, the blade electrode

is raised by means of two hangers or fingers 118 and 120 which engage the under surface of the blade web. The hanger 118 is rigidly fastened to the cover 78 by means of screw 122 and a spacer 124. The hanger 120 is pivotally connected to the cover 78 being maintained in the position shown in Fig. 8 by means of a spring 126, the hanger being manually rotated downwardly against the force of the spring to remove the blade electrode.

From the above description it will be apparent that with the cover 78 closed the magazine compartment 74 is substantially sealed from atmosphere except for the slit between the recording blade flange 112 and the cylinder 86 which slit is substantially blocked by the web of paper when the recorder is loaded so that the compartment acts as a humidifier which retains the paper with the proper degree of moisture content until after it has reached the recording electrodes; at the same time permitting visual inspection of the record immediately after it has been made.

It should be understood that the present disclosure is for the purpose of illustration only and that this invention includes all modifications and equivalents which fall within the scope of the appended claims.

I claim:

1. Apparatus for making a record upon a web of electrosensitive paper comprising a casing having a magazine compartment for holding a supply of paper, said compartment being closed except for a slit through which the paper is fed, and a recording element having a portion in contact with the paper which portion forms one side of said slit so that the paper completes a seal for said magazine compartment.

2. Apparatus for making a record upon a web of electrosensitive paper comprising a casing having a magazine compartment for holding a supply of the paper, said compartment being closed except for a slit through which the paper is fed, and a recording element having an effective portion in contact with the paper which portion forms one side of said slit so that the paper completes a seal for said magazine compartment.

3. Apparatus for making a record upon a web of electrosensitive paper comprising a casing having a magazine compartment for holding a supply of the paper, said compartment being closed except for a slit through which the paper is fed, and recording means including a blade having an effective portion in contact with one side of the paper and a drum having helically disposed about its periphery a conducting strip contacting the opposite side of the paper, said drum and said blade forming the respective sides of said slit so that the paper completes a seal for said magazine compartment.

4. Apparatus for making a record upon a web of electrosensitive paper comprising a casing including a housing having a magazine compartment for holding a supply of paper and a cover for said housing which closes said compartment except for a slit through which the paper is fed, and recording means including a blade mounted in said cover so that the effective portion thereof is in contact with one side of the paper and a drum journaled in said housing and having a conducting strip helically arranged upon its periphery to contact the opposite side of the paper, said drum and blade forming the respective sides of said slit so that the paper completes a seal for said magazine compartment.

5. Apparatus for making a record upon a web of

7

electrosensitive paper comprising a casing including a housing having a magazine compartment for holding a supply of paper and a cover for said housing which closes said compartment except for a slit through which the paper is fed, and recording means including a blade resiliently supported by said cover, stop means on said housing for positioning the blade when the cover is closed so that the effective portion thereof is in contact with one side of the paper, and a drum journaled in said housing and having a conducting strip helically arranged upon its periphery to contact the opposite side of the paper, said drum and blade forming the respective sides of said slit so that the paper completes a seal for said magazine compartment.

6. Apparatus for making a record upon a web of electrosensitive paper comprising a casing including a housing having a magazine compartment for holding a supply of paper and a cover for said housing which closes said compartment except for a slit through which the paper is fed, and recording means including a channel-shaped blade resiliently supported by said cover, a sealing gasket of yieldable material interposed between the blade and the cover, two stop pieces having V-notches therein secured to the housing so that the notches receive one flange of the blade when the cover is closed whereby the other flange is positioned as the effective recording portion in contact with one side of the paper, and a drum journaled in said housing and having a conducting strip helically arranged upon its periphery to contact the opposite side of the paper, said drum and blade forming the respective sides of said slit so that the paper completes a seal for said magazine compartment.

7. Apparatus for making a record upon a web of electrosensitive paper comprising a casing including a housing having a magazine compartment for holding a supply of paper and a cover for said housing which closes said compartment except for a slit through which the paper is fed, and recording means including a drum journaled in said housing and having a conducting strip helically arranged upon its periphery to contact one side of the paper, and a moving electrode

8

assembly resiliently supported by said cover, said assembly including a tape of electrically conducting material, means for moving the tape transversely of the paper web in contact with the opposite side thereof so that the edge thereof acts as the effective recording portion, said drum and tape edge forming the respective sides of said slit so that the paper completes a seal for said magazine compartment.

8. Apparatus for making a record upon a web of electrosensitive paper comprising a casing including a housing having a magazine compartment for holding a supply of paper, a cover for said housing which closes said compartment except for a slit through which the paper is fed, and recording means including a drum journaled in said housing and having a conducting strip helically arranged upon its periphery to contact one side of the paper, and a moving electrode assembly including a frame having a pulley journaled at each of the respective ends thereof, a tape of electrically conducting material positioned about said pulleys in the form of a loop, means for driving one of said pulleys to move the tape, a resilient supporting panel for suspending the frame from said cover to position the edge of one side of the loop transversely of the web and in contact with the opposite side of the paper so that the edge acts as the effective recording portion, said panel forming one of the walls of the magazine compartment, and a sealing piece interposed between the cover and each of the respective pulleys so that the tape comes into contact therewith as it passes about the pulleys, said drum and tape edge forming the respective sides of said slit so that the paper completes a seal for said magazine compartment.

MILTON ALDEN.

References Cited in the file of this patent

UNITED STATES PATENTS

Number	Name	Date
2,540,081	Alden	Feb. 6, 1951
2,572,462	Finch	Oct. 23, 1951